Michael Baker
INTERNATIONAL

Enhancing Patient, Clinical and Non-Clinical Experience

THROUGH ARTIFICIAL INTELLIGENCE, SMART BUILDINGS AND CYBERSECURITY – FOR HEALTHCARE

We Make a Difference

DELIVERING VALUE TO PATIENTS, CLINICAL AND NON-CLINICAL STAFF, AND HEALTH SYSTEMS

BETTER CLINICAL AND OPERATIONAL OUTCOMES WITH ARTIFICIAL INTELLIGENCE (AI), SMART BUILDINGS AND CYBERSECURITY

Healthcare facilities function as integrated care delivery ecosystems, where patient safety, clinical effectiveness and operational efficiency must intersect seamlessly. In the rapidly evolving healthcare landscape, artificial intelligence (AI), smart building technologies and robust cybersecurity work together to create environments that boost patient experiences, streamline clinical workflows, enable resiliency and optimize resource utilization.

This paper presents a phased approach to planning, implementing and continuously enhancing healthcare environments. It prioritizes quality patient outcomes, clinician satisfaction and regulatory compliance, while utilizing advanced building control systems, Internet of Medical Things (IoMT) modalities such as IP enabled Magnetic Resonance Imaging (MRI), nursing station automation and other IP enabled clinical technology software, data analytics and system interoperability.

DELIVERING VALUE TO PATIENTS, CLINICAL AND NON-CLINICAL STAFF, AND HEALTH SYSTEMS

Integrating advanced technologies with strong interoperability creates environments that support quality care, financial sustainability and regulatory compliance.

Operational and Financial Gains

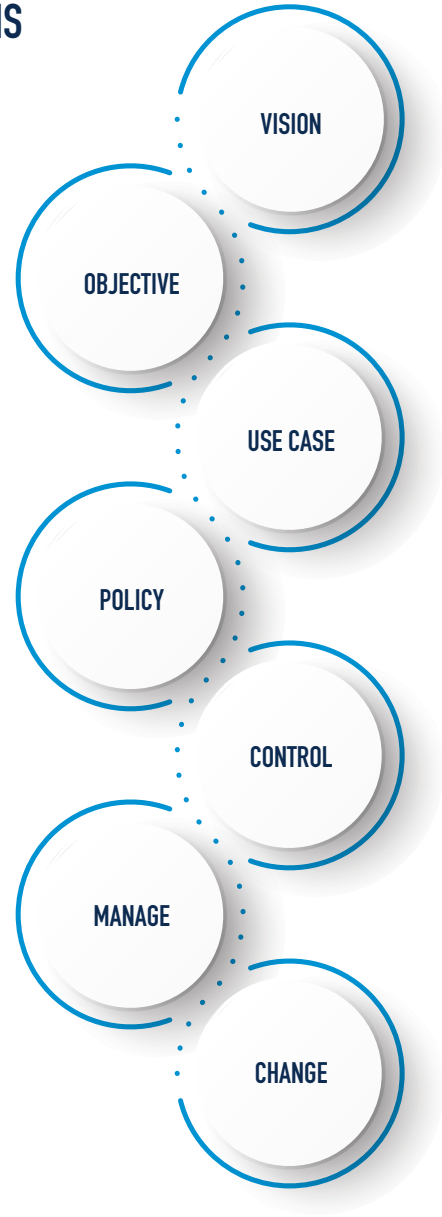
- *Lower energy and Facility Operations (FacOps) cost, via predictive maintenance and AI-driven resource allocation*
- *Ability to reinvest savings in strategic initiatives, such as specialized care programs or innovative technologies*

Empowered Clinical Teams

- *Reduced administrative overhead through real-time synchronization between building systems and clinical workflows*
- *Streamlined patient throughputs*

Elevated Patient Experience

- *Streamline appointment scheduling*
- *Enhance wayfinding and building/site navigation*
- *Invest in technology and analytical tools*
- *Ensure, coordination and data-driven decisions are enabled by integrated dashboards and alerts*



We Make a Difference

A COMPREHENSIVE, PHASED APPROACH TO A SMARTER HEALTHCARE ECOSYSTEM

This phased approach ensures healthcare organizations can design, implement, procure, deploy, and refine cyber-secure smart building solutions alongside existing Electronic Health Records (EHRs), Health Information Exchanges (HIEs), and clinical systems in a vendor-agnostic manner.

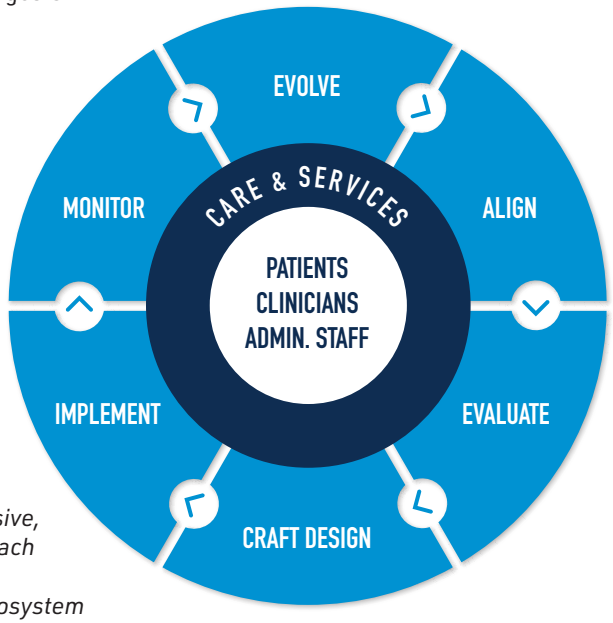
ALIGNING FACILITY, CLINICAL AND DIGITAL ROADMAPS

Establish a high-level vision that integrates facility design, technology objectives, and clinical outcomes.

Smart Building 101 Workshops: Introduce key stakeholders such as clinical leadership, facility managers, and IT teams to the potential artificial intelligence and other integrations

Use Case Workshops: Identify and prioritize scenarios to improve patient flow (e.g., automated discharge notifications), staff safety, reduce clinical fatigue, etc.

Strategy and Roadmaps: Develop a unified blueprint for leveraging smart building capabilities aligned with clinical pathways and revenue cycle goals



A comprehensive, phased approach to a smarter healthcare ecosystem

EVALUATING READINESS

Prior to implementing a new technology, conduct a thorough evaluation of the facility's current infrastructure, digital automation maturity, and security posture including any recent Joint Commission of Accredited Healthcare Organization (JCAHO) results

Cybersecurity Assessments (IoMT, Building Systems)

- *Analyze network vulnerabilities, data exchanges, access points, systems, and endpoints*
- *Verify alignment with recognized security frameworks (NIST, ISO, ISA, and related JCAHO emergency management requirements etc.)*
- *Secure clinical and facility environment with strong authentication and encryption*

Cybersecurity Incident Response & Recovery

- *Review policies and procedures for clinical and facility environments*
- *Assess response to cybersecurity incidents or system failures*
- *Validate backup and recovery plans to ensure continuation of care and resilience*
- *Define staff roles for remediation and restoration of critical services*

Cybersecurity and Smart Building Readiness Assessments

- *Assess the building infrastructure for digital enablement (HVAC, lighting, occupancy, assets, nurse call, etc.)*
- *Evaluate the current workflows for potential real-time data synchronization opportunities*
- *Prepare for Joint Commission on Accreditation of Healthcare Organizations (JCAHO) surveys for utilities and other building related systems*

Asset and Workflow Assessments

- *Collect or create asset lists, document relationships, and map clinical and/or operational workflows to identify inefficiencies*
- *Determine how building data can augment patient safety and streamline staff tasks*

A COMPREHENSIVE, PHASED APPROACH TO A SMARTER HEALTHCARE ECOSYSTEM

CRAFTING ENVIRONMENTS OPTIMIZED FOR CARE DELIVERY

Collaborate with clinical engineering and facilities teams to design spaces that foster healing, support staff efficiency, and integrate with digital health tools:

Architectural, Engineering, and Construction (AEC) Services
Partner with architects and engineers on room designs to ensure seamless integration of vital data, HVAC, lighting, patient entertainment systems, workstations, IoMT, etc. For example, embedded airflow management and space planning to help support infection and control guidelines (e.g., CDC, etc.)

Design Assistance
Tailor the layout, systems, and technology of the space (e.g., EDs, ORs, ICUs, etc.to maximize efficiency in emergent and critical care scenarios

Divisional Specifications and Guidelines
Standardize design technology and features across service lines for consistent patient and clinician-centric experiences (e.g., oncology, cardiology, pediatrics, etc.)

IMPLEMENTING INTEGRATED TECHNOLOGIES

Deploy physical and digital infrastructure to enhance care delivery, connecting facility systems with clinical applications.

Construction Administration

- *Oversee the installation of building automation systems, advanced HVAC, lighting and IP enabled sensors*
- *Coordinate with appropriate stakeholders to ensure low-voltage wiring, networks, and integration point are properly configured*

Smart Hospital Platform and Digital Twin

- *Develop a centralized platform for real-time monitoring of assets, energy usage, and occupancy*
- *Utilize digital twins (DT) to evaluate the impact on operations in the event of failures*
- *Implement digital twin technology to simulate how changes in patient volume or staff occupancy affect clinical workflows*

AI and ML Solutions

- *Integrate predictive analytics for patient throughput, capacity management and preventative maintenance*
- *Automate routine clinical and operational tasks and generate real-time alerts in systems for anomalies*

Fault Detection and Diagnostics (FDD)

- *Identify and rectify building system inefficiencies before they disrupt patient care*

Independent Data Layer

- *Foster interoperability and data access across different systems (Asset mgmt., operations, etc.) via a vendor-agnostic solution*
- *Support unified analytics to link operational and clinical data in performance dashboards*

A COMPREHENSIVE, PHASED APPROACH TO A SMARTER HEALTHCARE ECOSYSTEM

CONTINUOUS MONITORING AND OPTIMIZATION

After the infrastructure is in place, adopt a proactive stance to maintain and refine environment variables that support high-quality clinical care. We emphasize continuous monitoring and optimization of systems that support positive experiences.

Measurement and Verification Services

- *Track, monitor and control environmental and Operational Key Performance Indicators (KPIs) that impact patient recovery, infection control, and staff well-being (air quality, temperature, humidity, Volatile Organic Compounds (V.O.C.s), etc.)*
- *Confirm data integrity between clinical events and building automation system alerts*

Monitoring Based Commissioning (MBCx)

- *Use real-time analytics to predict and prevent building automation system failures*
- *Integrate building automation system alerts with clinical workflows*

Organizational Alignment

- *Offer role-based training so clinical staff, facility managers, and IT teams fully leverage new technology*
- *Promote collaboration to ensure shared ownership of outcomes*

KPI Development and Tracking

- *Establish metrics for patient satisfaction, staff efficiency, and resource utilization*
- *Measure improvements in key clinical outcomes (length of stay, re-admissions, etc.) alongside operational gains (energy cost savings, reduced downtime, etc.)*

Real-Time Monitoring

- *Implement continuous monitoring of building control systems to detect and respond to anomalies promptly. Use AI and machine learning to predict and prevent system failures*

EVOLVE WITH NEXT-GENERATION HEALTHCARE NEEDS

Ensure future advancements in technology, workflow optimization, and patient experience are continually integrated.

Staff Augmentation

- *Provide teams with expertise in specialized roles to support ongoing and new initiatives*

Governance and Program Management

- *Create oversight committees spanning IT, clinical, and compliance disciplines to steer continuous improvement*
- *Develop a Cybersecurity Governance Framework and establish oversight committees spanning IT, clinical, and compliance disciplines to steer continuous improvement in cybersecurity & emerging technology practices*
- *Role-Based Training: Provide training for clinical staff, facility managers, and IT teams to fully leverage new technologies and understand cybersecurity protocols*

Lessons Learned Reviews

- *Collect feedback from clinicians, patients, and system performance data to refine future strategies (Patient throughput, emergency response times, uptime, patient satisfaction, etc.)*

Revisiting the Framework

- *Update strategies to address evolving regulatory needs and support the larger emerging technologies effort*
- *Conduct new assessments for expansions or acquisitions, emphasizing interoperability and capacity planning.*
- *Refine resilient designs to reduce clinician burnout, reinforce infection control, and improve the healing environment*
- *Upgrade systems to remain current with the latest AI, sensor technologies, Internet of Medical Things (IoMT) modalities, and clinical data standards*
- *Enhance operations by incorporating advance analytics that forecast staffing needs, reduce operational costs, and improve patient throughput*

CONTACT

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"WE HELP YOU BUILD THE NEXT GENERATION OF INTELLIGENT, PATIENT AND STAFF-CENTERED HEALTHCARE ENVIRONMENTS"

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OUTCOMES OF PRIORITIZING THE PATIENT AND CLINICAL AND NON-CLINICAL STAFF EXPERIENCE WITH ARTIFICIAL INTELLIGENCE (AI), SMART BUILDINGS AND CYBERSECURITY

Healthcare environments influence clinical outcomes and staff performance. Creating smarter facilities involves bridging the gap between clinical engineering and the built environment (e.g., HVAC, lighting, occupancy, etc.).

Patients, Families and Caregivers

- *Personalized Care Experience: From integrated room controls (lighting, temperature, entertainment, etc.) to patient-facing mobile or portal solutions*
- *Patient-facing mobile or portal solutions: Allow patients and caregivers to manage appointments, review personal health data, and communicate with care teams through user-friendly mobile applications or web-based portals.*
- *Privacy and Data Security: Ensuring Protected Health Information (PHI) is secure whether accessed through bedside tablets or remote telehealth services*
- *Wearable technology: Integrate wearable devices into clinical workflows for more accurate, real time patient data that supports proactive care and improved outcomes.*

Clinicians and Administrative Staff

- *Streamlined Workflows: Utilizing AI-driven tools to reduce manual documentation, integrate real-time location systems (RTLS), and automate alerts from building management systems directly into the clinical workflow*
- *Care Team Collaboration: Linking building data, such as occupancy, air quality, or infection control parameters with clinical decision support systems for better coordination of care*

A HUMAN CENTRIC, TECHNOLOGY ENABLED HEALTHCARE ENVIRONMENT

Healthcare organizations can create data-driven, flexible environments that foster better outcomes, higher satisfaction scores, and optimized resource management by focusing on patient-centered care and clinician-friendly workflow, while employing a structured, vendor-agnostic framework that integrates seamlessly with existing systems in the clinical and Enterprise IT environment.

Through end-to-end services spanning strategy, assessment, design, build, operation, and iteration, Michael Baker International Secure Intelligent Solutions can help provide designs, consulting, and assessments for medical, industrial and IoMT across pharmacy, surgical, radiology, teleradiology and laboratory applications specifically tailored to the complexities and priorities of modern healthcare facilities.

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